Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A computer-implemented method for predicting failure in a system, the method comprising:

receiving data associated with a system, the received data including sensed data indicative of a system response to a specific load on the system while the system is in operation other than undergoing a system test;

calculating a prediction indicative of a potential failure of said system using a pre-selected ~~physics-based~~ probabilistic model and said received data, the ~~physics based~~ probabilistic model selected to calculate said prediction based on at least the specific load; and

wherein the probabilistic model utilizes at least one of fast probability methods and simulation techniques~~communicating said prediction~~.

2. (Original) The method of claim 1, wherein said measuring further comprises receiving system information from said system.

3. (Previously Presented) The method of claim 1, wherein said calculating a prediction further comprises calculating a prediction of a failure of a component of said system.

4. (Previously Presented) The method of claim 1, wherein said calculating a prediction further comprises calculating a prediction of a failure of multiple systems based on said prediction.

5. (Currently Amended) ~~The method of claim 1~~, A computer-implemented method for predicting failure in a system, the method comprising:

receiving data associated with a system, the received data including sensed data indicative of a system response to a specific load on the system while the system is in operation other than undergoing a system test;

calculating a prediction indicative of a potential failure of said system using a pre-selected probabilistic model and said received data, the probabilistic model selected to calculate said prediction based on at least the specific load, wherein the data indicative of a system response to a specific load comprises a bend angle~~, and wherein creating a prediction indicative of a potential failure of said system using a physics based probabilistic model and said received data comprises using the bend angle and the physics based probabilistic model to generate a response surface~~.

6. (Previously Presented) The method of claim 1, further comprising comparing said prediction to criteria.

7. (Currently Amended) The method of claim 1, further comprising communicating the prediction, and wherein at least one of said calculating and communicating steps occurs at a location remote from said system.

8. (Currently Amended) The method of claim 1, wherein said ~~physics based~~ probabilistic model comprises multiple pre-selected ~~physics based~~ probabilistic models, wherein at least one of the multiple pre-selected ~~physics based~~ probabilistic models is selected to calculate the prediction based on the one or more pre-determined failure modes of the system.

9. (Currently Amended) The method of claim 1, further comprising ranking variables in said ~~physics-based~~ probabilistic model according to said variable's contribution to said prediction.

10. (Original) The method of claim 1, applied to predict failure in a material's microstructure.

11. (Previously Presented) The method of claim 1, wherein said received data further comprises referred data and inferred data and wherein said method further comprises relating said referred data to a first set of variables, relating said sensed data to a second set of variables, and inferring a third set of variables from said sensed data.

12. (Previously Presented) The method of claim 1, further comprising sending at least some of said received data to a remote location and wherein said calculating said prediction occurs at said remote location.

13. (Original) The method of claim 12, further comprising receiving said prediction from said remote location.

14. (Currently Amended) The method of claim 1, further comprising developing said ~~physics-based~~ probabilistic model prior to said calculating said prediction.

15. (Currently Amended) The method of claim 14, wherein said developing further comprises:

identifying at least one failure mechanism of a component of said system from said component's characteristics selected from the group consisting of: material properties, environmental conditions, design characteristics, component loading, and component usage;

identifying significant random variables of said at least one failure mechanism;

identifying statistical parameters of said significant random variables; and

formulating a strategy for ~~physics-based~~ probabilistic analysis based on said identifying steps.

16. (Previously Presented) The method of claim 15, wherein said received data further comprises referred data and inferred data and wherein said developing step further comprises determining which of said significant random variables are related to said referred data, which of said significant random variables are related to said sensed data, and which of said significant random variables are inferred from said sensed data.

17. (Original) The method of claim 12, wherein said developing further comprises setting criteria for communicating said prediction.

18. (Currently Amended) The method of claim 1, wherein said ~~physics-based~~ probabilistic model utilizes fast probability methods.

19. (Previously Presented) The method of claim 18, wherein said fast probability methods are direct fast probability methods selected from the group consisting of: First Order Reliability Methods, Second Order Reliability Methods, Advanced Mean Value methods, and Mean Value methods.

20. (Previously Presented) The method of claim 18, wherein said fast probability methods are response surface fast probability methods selected from the group consisting of: First Order Reliability Methods, Second Order Reliability Methods, Advanced Mean Value methods, and Mean Value methods.

21. (Currently Amended) The method of claim 1, wherein said ~~physics-based~~ probabilistic model utilizes simulation techniques.

22. (Previously Presented) The method of claim 21, wherein said simulation techniques are direct methods selected from the group consisting of: Monte Carlo methods and importance sampling methods.

23. (Previously Presented) The method of claim 21, wherein said simulation techniques are response surface methods selected from the group consisting of: Monte Carlo methods and importance sampling methods.

24. (Currently Amended) ~~The method of claim 151~~A computer-implemented method for predicting failure in a system, the method comprising:

receiving data associated with a system, the received data including sensed data indicative of a system response to a specific load on the system while the system is in operation other than undergoing a system test;

calculating a prediction indicative of a potential failure of said system using a pre-selected probabilistic model and said received data, the probabilistic model selected to calculate said prediction based on at least the specific load, wherein the probabilistic model is selected based on at least one failure mechanism including a ~~at least one said~~ failure mechanism ~~is~~ described by an equation ~~and said equation is divided into~~ having at least a capacity section and a demand section.

25. (Currently Amended) An apparatus for monitoring a system, said apparatus comprising:

sensors for acquiring sensed data indicative of a current physical state of a particular system; and

one or more data processing systems including a first computer comprising:

a processor; and

a memory comprising:

instructions for receiving data including said acquired data;

instructions for determining a current operation status of said particular system using a ~~physics-based~~ probabilistic model to determine the current operation status based on a probable response of the particular system to one or more external parameters at a current time, and further using said acquired data; and

wherein the probabilistic model utilizes at least one of fast probability methods and simulation techniques.

~~instructions for communicating said current operation status; and~~

~~a communication device for communicating said current operation status.~~

26. (Previously Presented) The apparatus of claim 25, wherein said instructions for determining the current operation status further comprise instructions for determining a probable response of at least one component of said system to the one or more external parameters at the current time.

27. (Currently Amended) ~~The apparatus of claim 26~~An apparatus for monitoring a system, said apparatus comprising:

sensors for acquiring sensed data indicative of a current physical state of a particular

system; and

one or more data processing systems including a first computer comprising:

a processor; and

a memory comprising:

instructions for receiving data including said acquired data;

instructions for determining a current operation status of said particular system using a probabilistic model to determine the current operation status based on a probable response of the particular system to one or more external parameters at a current time, and further using said acquired data, wherein said instructions for determining a probable response of said at least one component of said system to the one or more external parameters at the current time comprises instructions for performing finite element analysis using at least a component configuration and data indicative of the one or more external parameters at the current time.

28. (Currently Amended) The apparatus of claim 27, wherein the one or more data processing systems further comprise instructions for determining a future operation status of said particular system using the ~~physics-based~~ probabilistic model.

29. (Previously Presented) The apparatus of claim 25, the data processing system further comprising:

a second computer, said second computer comprising:

a processor; and

a memory, said memory comprising:

instructions for receiving said current operation status; and

instructions for communicating said current operation status; and

a second communication device for communicating said current operation status.

30. (Currently Amended) The apparatus of claim 25, further including a communication device, and wherein said communication device ~~further comprises~~ is configured to generate a warning signal.

31. (Previously Presented) The apparatus of claim 25, said apparatus further comprising a sending device for sending at least some of said received data to a location remote from said system.

32. (Previously Presented) The apparatus of claim 31, wherein said first computer is located remote from said system.

33. (Previously Presented) The apparatus of claim 25, further comprising instructions for comparing said current operation status to criteria.

34. (Currently Amended) The apparatus of claim 25, wherein said ~~physics-based~~ probabilistic model comprises multiple models.

35. (Currently Amended) The apparatus of claim 25, wherein said ~~physics-based~~ probabilistic model comprises variables ranked according to said variables' contribution to said current operation status.

36. (Original) The apparatus of claim 25, applied to predict failure in a material's microstructure.

37. (Previously Presented) The apparatus of claim 25, wherein said received data further comprises referred data and inferred data and wherein said apparatus further comprises instructions for:

relating said referred data to a first set of variables;

relating said acquired data to a second set of variables; and

inferring a third set of variables from said acquired data.

38. (Currently Amended) The apparatus of claim 25, wherein said ~~physics-based~~ probabilistic model utilizes fast probability methods.

39. (Previously Presented) The apparatus of claim 38, wherein said fast probability methods are direct fast probability methods selected from the group consisting of: First Order Reliability Methods, Second Order Reliability Methods, Advanced Mean Value methods, and Mean Value methods.

40. (Previously Presented) The apparatus of claim 38, wherein said fast probability methods are response surface fast probability methods selected from the group consisting of: First Order Reliability Methods, Second Order Reliability Methods, Advanced Mean Value methods, and Mean Value methods.

41. (Currently Amended) The apparatus of claim 25, wherein said ~~physics-based~~ probabilistic model utilizes simulation techniques.

42. (Previously Presented) The apparatus of claim 41, wherein said simulation techniques are direct methods selected from the group consisting of: Monte Carlo methods; and importance sampling methods.

43. (Previously Presented) The apparatus of claim 41, wherein said simulation techniques are response surface methods selected from the group consisting of: Monte Carlo methods; and importance sampling methods.

44. (Original) The apparatus of claim 25, wherein said instructions for creating further comprise instructions for creating a prediction of a failure of multiple systems based on said prediction.

45. (Currently Amended) The apparatus of claim 25, said ~~physics-based~~ probabilistic model is pre-selected based on at least one failure mechanism of a component of said system.

46. (Previously Presented) The apparatus of claim 45, wherein said at least one failure mechanism relates to a material microstructure.

47. (Currently Amended) ~~The apparatus of claim 25~~An apparatus for monitoring a system, said apparatus comprising:

sensors for acquiring sensed data indicative of a current physical state of a particular system; and

one or more data processing systems including a first computer comprising:

a processor; and

a memory comprising:

instructions for receiving data including said acquired data;

instructions for determining a current operation status of said particular system using a probabilistic model to determine the current operation status based on a probable response of the particular system to one or more external parameters at a current time, and further using said acquired data, wherein the probabilistic model is selected based on at least one failure mechanism including a ~~said at least one~~ failure mechanism ~~is~~ described by an equation ~~and said equation is divided into~~ including a capacity section and a demand section.

48. (Currently Amended) A computer program product for predicting failure of a system for use in conjunction with a computer system, said computer program product comprising:

a computer readable storage medium and a computer program mechanism embedded therein, said computer program mechanism comprising:

instructions for receiving data including sensed data indicative of a current physical state;

instructions for determining a failure probability of said system using a ~~physics-based~~ probabilistic model and said data, the ~~physics-based~~ probabilistic model to determine the failure probability based on modeling a response of the system to at least one force; and

wherein the probabilistic model utilizes at least one of fast probability methods and simulation techniques.

~~instructions for communicating data indicative of said determined failure probability~~.

49. (Previously Presented) The computer program product of claim 48, wherein the instructions for determining the failure probability of the system further comprise instructions for determining a probable response of at least one component of said system to the at least one force.

50. (Currently Amended) ~~The computer program product of claim 48~~A computer program product for predicting failure of a system for use in conjunction with a computer system, said computer program product comprising:

a computer readable storage medium and a computer program mechanism embedded therein, said computer program mechanism comprising:

instructions for receiving data including sensed data indicative of a current physical state;

instructions for determining a failure probability of said system using a probabilistic model and said data, the probabilistic model to determine the failure probability based on modeling a response of the system to at least one force, wherein said instructions for determining the probable response of at least one component of the system to the at least one force comprise instructions for performing finite element analysis using at least a component configuration and data indicative of the at least one force.

51. (Previously Presented) The computer program product of claim 48, wherein said instructions for determining a failure probability further comprise instructions for determining a failure probability of multiple systems based on said sensed data indicative of the current physical state.

52. (Currently Amended) The computer program product of claim 48, said ~~physics based~~ probabilistic model is pre-selected based on at least one pre-determined failure mechanism of a component of said system.

53.(Previously Presented) The computer program product of claim 48, wherein said at least one pre-determined failure mechanism relates to a material microstructure.

54. (Currently Amended) A computer program product for predicting failure of a system for use in conjunction with a computer system, said computer program product comprising:

a computer readable storage medium and a computer program mechanism embedded therein, said computer program mechanism comprising:

instructions for receiving data including sensed data indicative of a current physical state;

instructions for determining a failure probability of said system using a probabilistic model and said data, the probabilistic model to determine the failure probability based on modeling a response of the system to at least one force, wherein the probabilistic model is selected based on at least one pre-determined failure mechanism including a mechanism ~~said at least one pre-determined failure mechanism is~~ described by an equation ~~and said equation is divided into~~ having at least a capacity section and a demand section.

55. (Previously Presented) The computer program product of claim 48, further comprising instructions for comparing said failure probability to criteria.

56. (Currently Amended) The computer program product of claim 48 wherein said ~~physics based~~ probabilistic model comprises multiple ~~physics based~~ probabilistic models.

57. (Currently Amended) The computer program product of claim 48, further comprising ranking variables in said ~~physics based~~ probabilistic model according to said variables' contribution to said failure probability.

58. (Original) The computer program product of claim 48, applied to predict failure in a material's microstructure.

59. (Previously Presented) The computer program product of claim 48, wherein said received data further comprises:

referred data; and

inferred data and wherein said apparatus further comprises:

instructions for relating said referred data to a first set of variables; instructions for relating said sensed data to a second set of variables; and instructions for inferring a third set of variables from said sensed data.

60. (Currently Amended) The computer program product of claim 48, wherein said ~~physics-based~~ probabilistic model utilizes fast probability methods.

61. (Previously Presented) The computer program product of claim 60, wherein said fast probability methods are direct fast probability methods selected from the group consisting of: First Order Reliability Methods, Second Order Reliability Methods, Advanced Mean Value methods, and Mean Value methods.

62. (Previously Presented) The computer program product of claim 60, wherein said fast probability methods are response surface fast probability methods selected from the group consisting of: First Order Reliability Methods, Second Order Reliability Methods, Advanced Mean Value methods, and Mean Value methods.

63. (Currently Amended) The computer program product of claim 48, wherein said ~~physics-based~~ probabilistic model utilizes simulation techniques.

64. (Previously Presented) The computer program product of claim 63, wherein said simulation techniques are direct methods selected from the group consisting of: Monte Carlo methods, and importance sampling methods.

65. (Previously Presented) The computer program product of claim 63, wherein said simulation techniques are response surface methods selected from the group consisting of: Monte Carlo methods, and importance sampling methods.

66. (Currently Amended) The computer program product of claim 49, further comprising:

instructions for determining a future failure probability of said system using the ~~physics based~~ probabilistic model.

67. (Previously Presented) The computer program product of claim 48, further comprising:

a second computer program product, said second computer program product comprising:

a second computer readable storage medium and a second computer program mechanism embedded therein, said second computer program mechanism comprising:

instructions for receiving said failure probability; and

instructions for communicating said failure probability.

68. (Previously presented) A computer-implemented method for predicting failure in a system, the method comprising:

receiving data associated with the system while the system is in operation other than undergoing system test;

during system operation, ascertaining a probability of failure for each of a plurality of pre-determined failure mechanisms using a physics based first probabilistic failure model, wherein said probability of failure for each of said failure mechanisms is based at least partially on said received data and said pre-determined failure mechanisms;

predicting a probability of failure for the system using a physics based second probabilistic failure model, wherein said probability of failure for the system is at least partially based on said probability of failure of said failure mechanisms; and

communicating the probability of failure of the system.

69. (Previously Presented) The method of claim 68, further comprising, before said ascertaining, determining one or more suitable physics based probabilistic failure models for each failure mechanism.

70. (Previously Presented) The method of claim 68, wherein said failure mechanisms are selected from the group consisting of: cracking, delamination, shearing, bending, and tension fracture.

71. (Previously Presented) The method of claim 68, wherein said failure mechanisms are selected from the group consisting of: material properties, environmental conditions, design characteristics, component loading, and component usage.

72. (Previously Presented) The method of claim 68, wherein said probability of failure for each of said failure mechanisms is further based on variability of physical parameters of said system.

73. (Previously Presented) The method of claim 68, wherein said probability of failure for each of said failure mechanisms is further based on a variability of directly sensed variables, a variability of referred variables, and a variability of inferred variables.

74. (Previously Presented) A computer implemented method for predicting failure in a system, comprising:

determining failure mechanisms for a system;

receiving data associated with the system while the system is in operation other than undergoing system test;

selecting at least one suitable physics based probabilistic failure model for each failure mechanism;

ascertaining a probability of failure for each of said failure mechanisms using a selected physics based first probabilistic failure model, wherein said probability of failure for each of said failure mechanisms is based at least partially on said received data, said failure mechanisms, and variability of physical parameters of said system;

predicting a probability of failure for the system using a selected physics based second probabilistic failure model, wherein said probability of failure for the system is at least partially based on said probability of failure for each of said failure mechanisms; and

communicating said probability of failure for the system.

75. (Previously Presented) The method of claim 74, wherein said variability of physical parameters comprises a variability of directly sensed variables, a variability of referred variables, and a variability of inferred determined variables.

76. (Previously Presented) The method of claim 74, further comprising, before said communicating, determining a confidence of said probability of failure of said system based on historical failure data.

77. (New) The method of claim 5, further comprising using the bend angle and the probabilistic model to generate a response surface.

78. (New) The method of claim 24, further comprising communicating the preduction.

79. (New) The apparatus of claim 25, further comprising:
instructions for communicating said current operation status; and
a communication device for communicating said current operation status.

80. (New) The apparatus of claim 27, further comprising:
instructions for communicating said current operation status; and
a communication device for communicating said current operation status.

81. (New) The apparatus of claim 47, further comprising:
instructions for communicating said current operation status; and
a communication device for communicating said current operation status.

82. (New) A computer-implemented method for predicting failure in a system, the method comprising:

receiving data associated with a system, the received data including sensed data indicative of a system response to a specific load on the system while the system is in operation other than undergoing a system test;

calculating a prediction indicative of a potential failure of said system using a pre-selected probabilistic model and said received data, the probabilistic model selected to calculate said prediction based on at least the specific load, wherein calculating the prediction comprises determining a probable response of at least one component of said system to one or more external parameters by performing finite element analysis using at least a component configuration and data indicative of the one or more external parameters.

83. (New) The computer-implemented method of claim 82, further comprising communicating the prediction.